

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-13. (Cancelled).

14. (Currently amended) A liquid chromatography sample injection system comprising:

(a) a probe drive system of an automated liquid handler wherein the probe drive system comprises an arm and a probe mounted on the arm;

(b) an injector valve mounted on the arm of the probe drive system;

(c) a conduit, wherein the conduit directly connects the injector valve and the probe;
and

(d) a pump valve interfacing with the injector valve and a probe pump and a source of dilutant;

(e) a source of mobile phase interfacing with the injector valve; and

(f) a sample analyzer interfacing with the injector valve;

wherein the injector valve alternates between a loading position and an injection position; and further wherein the pump valve is movable between a first position where the probe pump is operable to dispense and to aspirate a sample through the probe, and a second position where the probe pump communicates with the source of dilutant for rinsing the probe, the pump valve rinsing the probe with dilutant after the injector valve loads the sample and injects the sample towards the sample analyzer.

15-20. (Cancelled).

21. (Currently amended) The liquid chromatography sample injection system of claim ~~20~~ 14 wherein the source of mobile phase comprises a pressurized liquid phase.
22. (Previously Presented) The liquid chromatography sample injection system of claim 21 wherein a high pressure pump supplies the source of mobile phase to the injector valve.
23. (Previously Presented) The liquid chromatography sample injection system of claim 14 wherein the sample analyzer comprises a liquid chromatography column.
24. (Previously Presented) The liquid chromatography sample injection system of claim 23 wherein the sample analyzer further comprises a detector.
25. (Previously Presented) The liquid chromatography sample injection system of claim 24 wherein the detector comprises an ion detector or a mass spectrometer.
26. (Previously Presented) The liquid chromatography sample injection system of claim 14 wherein the pump valve comprises a three-way valve.
27. (Currently amended) The liquid chromatography sample injection system of claim 14 wherein the probe drive system comprises an X arm extending horizontally in an X direction; a Y arm slidably mounted on the X arm wherein the Y arm extends horizontally in a Y direction; and a Z arm slidably mounted on the Y arm wherein the Z arm extends vertically in a Z direction, and further wherein the arm is at least one of the X arm, the Y arm, and the Z arm.
28. (Previously Presented) The liquid chromatography sample injection system of claim 27 wherein the injector valve is mounted on the Z arm of the probe drive system.
29. (Previously Presented) The liquid chromatography sample injection system of claim 14 wherein the injector valve is located within about 6 inches of a vertical axis of the probe.

30. (Previously Presented) The liquid chromatography sample injection system of claim 14 wherein the conduit has a length of less than 12 inches.

31. (Currently amended) The liquid chromatography sample injection system of claim 14 wherein the injector valve alternates between a sample loading position where the sample is aspirated and a sample injection position where the mobile phase forces the sample toward the sample analyzer.

32. (Previously Presented) The liquid chromatography sample injection system of claim 31 wherein an injection valve interface control module controls the alternation of the injector valve and a motor powers the alternation of the injector valve.

33. (Previously Presented) The liquid chromatography sample injection system of claim 14 wherein the injector valve is a six port injection valve.

34. (Previously Presented) The liquid chromatography sample injection system of claim 14 wherein the injector valve is a four port injector valve.

35. (Cancelled).

36. (Previously Presented) The liquid chromatography sample injection system of claim 14 further comprising a controller, wherein the controller operates the probe drive system.

37. (Currently amended) A liquid chromatography sample injection system comprising:

(a) a probe drive system of an automated liquid handler; wherein the probe drive system comprises an X arm extending horizontally in an X direction; a Y arm slidably mounted on the X arm to move in the direction of the X arm wherein the Y arm extends horizontally in a Y direction; and a Z arm slidably mounted on the Y arm to move in the direction of the Y arm wherein the Z arm extends vertically in a Z direction; and a probe holder slidably mounted on the Z arm to move in the direction of the Z arm;

(b) an injector valve mounted on the Z arm of the probe drive system; wherein the injector valve comprises a sample loop, a probe port, a mobile phase input port, a column output port and a probe pump port;

(c) a probe ~~directly~~ connected to the probe port and the probe holder;

(d) a sample analyzer connected to the column output port;

(e) a probe pump connected to the probe pump port; and

(f) a source of pressurized mobile phase connected to the mobile phase input port.

wherein the pump valve is movable between a first position where the probe pump is operable to dispense and to aspirate a sample through the probe, and a second position where the probe pump communicates with the source of dilutant for rinsing the probe, the pump valve rinsing the probe with dilutant after the injector valve loads the sample and injects the sample towards the sample analyzer.

38. (Currently amended) A method of injecting a sample into a sample analyzer of a liquid chromatography sample injection system comprising:

(a) placing an injection valve into a sample loading position, wherein the injection valve is mounted on an arm of a probe drive system of an automated liquid handler;

(b) operating a pump to provide a negative pressure through a pump valve ~~for aspirating to aspirate~~ a liquid sample through a probe of the probe drive system and into the injection valve;

(c) placing the injection valve into a sample injection position;

(d) entraining the liquid sample in the injection valve by addition of a mobile phase to force the liquid sample toward a sample analyzer;

(e) placing a pump valve into a rinse position automatically using a controller after forcing the liquid sample toward the sample analyzer;

~~(e) —operating the pump to provide a positive pressure through the pump valve for injecting the entrained liquid sample into a sample analyzer; and~~

(f) rinsing the probe by operating the pump to deliver a solvent through the pump valve and the injection valve to the probe.